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AN EVALUATION OF THE SUCCESS OF THE IMPLEMENTATION OF THE PARTNERS IN RESOURCE EXCELLENCE APPROACH AS RELATED TO THE DEVON CANADA CORPORATION JACKFISH 2 PROJECT – INTERCONNECTING PIPELINE

Prepared For:

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March 2009

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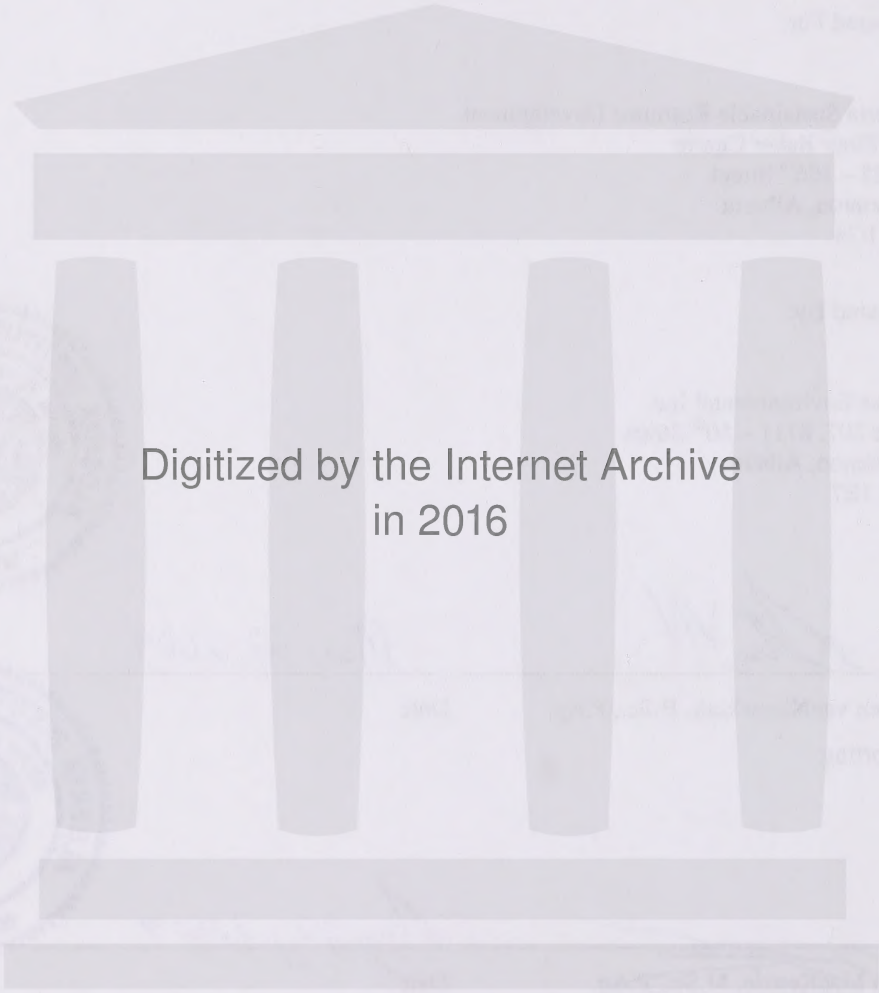

EXECUTIVE SUMMARY

Navus Environmental Inc. (Navus) was retained by Alberta Sustainable Resource Development (ASRD) to evaluate the success of the implementation of the Partners in Resource Excellence Program (P.I.R.E.) as related to the Devon Canada Corporation (Devon) Jackfish 2 Project Interconnecting Pipeline (hereafter referred to as "the project"). Specifically, evaluations of the approval process and implementation of new pipeline construction techniques developed as part of the Innovative Pipelining Strategies (I.P.S.) were designed to reduce the ecological footprint of the project were completed.

Navus evaluated the success of the process through on the ground observation and interaction with construction personnel during construction, interviews with all levels of stakeholders, and knowledge of pipe lining techniques and historical impacts. Navus also reviewed all relevant documents submitted by Devon to Alberta Environment (AENV) and ASRD during the approval process. This final report presents the findings from this evaluation and will be available both internally to government and externally to stakeholders so that future pipeline construction can benefit from this process.

The questionnaire was developed to obtain a current understanding from all stakeholders about the construction practices and relationships with respect to the project. The questionnaire was separated into 5 main sections: Philosophy, Project Specific, Working Together, Future Development and Miscellaneous.

Conclusions regarding the P.I.R.E. approach and the I.P.S. process were summarized and compiled. The P.I.R.E. approach is based upon a foundation of communication and collaboration to outline and achieve desired outcomes and specific project goals. It made the goal of reducing the ecological footprint of this project clear to all stakeholders resulting in using and applying new innovative concepts and technology. The P.I.R.E. approach met these goals and was instrumental in the success of this project.

The I.P.S. process was created as a result of the P.I.R.E. approach to reduce the ecological footprint of pipeline construction in Alberta by reducing RoW width and modifying

construction practices. The goal of the I.P.S. process on this project involved completing the project with a reduced RoW width where possible and returning 100% of the excavated soil back into the ditch effectively leaving no roach. This soil was able to be returned by mulching the large pieces of frozen soil and compacting the replaced soil from the "safe zone" up using packing wheels mounted on tracked excavators and a self propelled packer (BOMAG®). When compared to traditional pipeline construction methods where, during winter construction, large roaches were left over the pipeline ditch, the I.P.S. process returns the excavated soil to the ditch and provides a trafficable area to work with, reducing the need to clear/use the entire pipeline RoW. The I.P.S process was used to meet the project goals and will be deemed a complete success upon inspection in the summer/fall of 2009.

The recommendations were presented in three sections, general, P.I.R.E. and I.P.S. The general recommendations included assessing the potential to develop a best management practices for pipeline construction activities in the forested regions and increasing awareness of the P.I.R.E. approach and the I.P.S. process through presentations. The creation of a web-based knowledge base could document the information available to showcase success stories, provide a medium for discussion, examples of equipment and contacts for key individuals involved with the initiatives.

The P.I.R.E. recommendations included promoting the inclusion of additional stakeholders, AENV and ASRD continuing and increasing their presence promoting a reduction of the ecological footprint of pipelines in the forested regions and working together with stakeholders to streamline project requirements and expectations at all levels.

The I.P.S. recommendations included future monitoring comparing the outcome of the two pipeline methods and the establishment of a group to monitor the outcome of the I.P.S. process and new technologies to determine success.

The project was planned and completed with the intent of reducing the ecological footprint and increasing the success of ecological outcome. Upon evaluating the success through a site

inspection, this evolution in pipeline project planning and construction will set the standard for years to come.

In summary, the P.I.R.E. approach increased the awareness and emphasized the importance of using alternative construction techniques to reduce the ecological footprint of pipeline construction in Alberta. As a result of the P.I.R.E. approach, an alternative pipeline construction method was developed. The I.P.S. process was successful in reducing the ecological foot print compared to conventional pipeline construction methods.

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1.0 INTRODUCTION

Navus Environmental Inc. (Navus) was retained by Alberta Sustainable Resource Development (ASRD) to evaluate the success of the implementation of the Partners in Resource Excellence approach as related to the Devon Canada Corporation (Devon) Jackfish 2 Project Interconnecting Pipeline (hereafter referred to as "the project"). Specifically, evaluations of the approval process and implementation of new pipeline construction techniques designed to reduce the ecological footprint of the project were completed.

1.1 Scope of Work

Navus evaluated the success of the process through on-the-ground observation and interaction with construction personnel during construction, interviews with all levels of stakeholders, and knowledge of pipelining techniques and historical impacts. Navus also reviewed all relevant documents submitted by Devon to Alberta Environment (AENV) and ASRD during the approval process. This final report presents the findings from this evaluation and will be available both internally to government and externally to stakeholders so that future pipeline construction can benefit from this process.

2.0 BACKGROUND

2.1 Review of Background Information

Navus was provided with the contact information of key individuals from ASRD, Devon and AENV, who were heavily involved in the planning, development and execution of the project. These individuals provided background information on the project and the relationships between the stakeholders. This information was compiled and reviewed by Navus.

2.1.1 Pre-Disturbance Assessment

A Pre-Disturbance Assessment (PDA) entitled *Pre-Disturbance Assessment of the Jackfish 2 Project Interconnecting Pipeline* was completed in September 2008 by AMEC Earth and Environmental of Calgary, Alberta. The PDA was submitted to AENV in compliance with the terms and conditions identified in the *Environmental Protection and Enhancement Act* (EPEA) project approval 224816-00-00.

The information detailed in the September 2008 PDA includes:

1.0 Background and Methods

- Soil Assessments
- Vegetation and Rare Plants

2.0 PDA of the Interconnecting Pipeline

- Facility Overview
- Field Sampling
- Baseline Conditions
  - Soils and Terrain
  - Land Capability Classification
  - Vegetation and Rare Plants
- Conservation and Reclamation
  - Site Clearing and Timber Salvage
  - Soil Salvage and Trenching
  - Soil Replacement
  - Revegetation
  - Drainage
  - Weed Control
  - Waste and Spill Management
  - Reporting
  - Monitoring

2.1.2 Environmental Field Report

The Environmental Field Report (EFR) is a generic form outlining information requirements for surface dispositions as required by ASRD. Using the EFR, the applicant provides information on how a site will be constructed, operated and reclaimed to meet acceptable environmental standards as well as complying with legislation administered by ASRD (Alberta Sustainable Resource Development, 2008).

The EFR submitted to ASRD completed by Aurora Land for this project consisted of the cover document entitled *Environmental Field Report (EFR) – 2.0 Completion of EFR Cover*

Document for all Dispositions and the pipeline-specific document entitled *Environmental Field Report (EFR) – 5.0 Supplement C – Pipeline*.

The sections requiring completion in the EFR Cover Document include:

A. Communications
B. Surface Location
C. Wildlife/Environmental Concerns
D. Historical Resources
E. Vegetation and Timber Cover
F. Soil and Vegetation Management
G. Incidental Activities
H. Core Operating Conditions

The sections requiring completion in the EFR Pipeline Supplement include:

A. Pipeline Description
B. Method of Vehicle/Equipment Watercourse Crossings
C. Construction Strategy
D. Reclamation Strategy

2.1.3 Pre-Disturbance Assessment and Environmental Field Report Compared

The table provided below was created to establish a basis for comparison of the available background information from the PDA and EFR to identify overlapping sections/ideas.

Report Organization	PDA Sections	Similar Information*	EFR Sections
Project Contact Information	-	-	Communications
Background	Background and Methods	X	Surface Location
	Background Soils Information		Historical Resources
	Background Vegetation Information		-
Project Overview	Facilitiy Overview	X	Pipeline Description
Baseline Data	Field Sampling	-	-
	Baseline Soil and Terrain Conditions	-	-
	Baseline Land Capability Classification	-	-
	Baseline Vegetation and Rare Plants	X	Vegetation and Timber Cover
	-	-	Wildlife/Environmental Concerns
Project Specifics	Site Clearing and Timber Salvage	X	Vegetation and Timber Cover
	-	-	Incidental Activities
	Soil Salvage and Trenching	X	Soil and Vegetation Management; Construction Strategy; Reclamation Strategy
	Soil Replacement		
	Revegetation		
	Drainage		
	Weed Control		
	Waste and Spill Management		
	-	-	Method of Vehicle/Equipment Watercourse Crossings
Reporting	Reporting	X	Core Operating Conditions
	Monitoring	-	-

* or a section where similar information could be combined

2.2 Devon Canada Corporation Project Details

The project is an interconnecting group of 6 pipelines being constructed approximately 9.3 km between the Jackfish and Jackfish 2 Central Processing Facilities. The six pipelines vary from 4.5 to 12.75 inches in diameter and are licensed to transport fuel gas, fresh water, salt water, crude oil and LVP products. The pipelines were installed in two separate ditches with three lines in each ditch. The maximum operating pressures of this group of lines range from 4830 to 9930 kPa (Abacus Datagraphics Ltd., 2009). The maximum right-of-way (RoW) width available is 50 m. Construction was initially scheduled to commence in September 2008. The pre-disturbance assessment was completed by AMEC Earth and Environmental and the final document was completed in September 2008.

2.3 Partners in Resource Excellence

The Partners in Resource Excellence (P.I.R.E.) approach was initiated by Doug Kulba in 2005. Doug Kulba works for Alberta Environment in the Environmental Management Division and is based out of Grande Prairie, Alberta. Mr. Kulba is the P.I.R.E. Coordinator and also represents Innovative Pipelining Strategies (I.P.S.) within Alberta Environment. The I.P.S. concept and process were developed based on the relationships that were formed between the P.I.R.E. stakeholders.

Devon contacted Mr. Kulba in August 2007 and became a partner in the P.I.R.E. approach. As of April 30, 2008, Devon mandated the use of the I.P.S. process on agricultural land across Canada (M. LaBerge, Personal Communication, March 12, 2009). In August 2008, Mr. Kulba was introduced to the project and completed a tour of the proposed RoW by Devon representative Duane Steeves.

2.3.1 What is Partners in Resource Excellence?

Partners in Resource Excellence is an outcome-based environmental management approach that recognizes stakeholders must share the responsibility of resource development and strive for economic and environmental excellence. It brings together landowners, contractors, industry representatives, AENV and ASRD staff to identify and develop innovative solutions to oil and gas development concerns, particularly the construction and installation of pipelines in Alberta. Partners in Resource Excellence has been instrumental in helping AENV build trust among stakeholders and has resulted in increased stewardship and the development of a low impact approach to pipeline construction with the overall goal of reducing the ecological footprint referred to as I.P.S. (Appendix A).

2.3.2 Why did Partners in Resource Excellence Begin?

The construction and installation of approximately 15,000 kilometers per year of pipelines across Alberta results in a major land disturbance. Currently, there are approximately 400,000 kilometers of pipelines already installed in Alberta. In 2005, AENV Grande Prairie staff realized a number of similar on-going concerns arose during the conventional construction and installation of pipelines. The issues identified include the amount of topsoil salvaged, the size of the ditch in relation to pipeline diameter, the volume of soil displaced, incomplete return of soil into the ditch, weed issues, the time before the land is returned to the landowner and the resulting reclamation costs and ongoing environmental liability.

Alberta Environment's Grande Prairie staff began the P.I.R.E. approach as a means of communicating the desired land outcomes to the stakeholders and, at the same time, created an incentive to develop new procedures, tools and technology to meet agreed on environmental outcomes of pipeline projects. Staff acknowledged they needed help and

sought out key innovators to develop new technologies, methodologies and equipment to modify current pipeline practices. Alberta Environment and its partners continue the work of improving the system's approach to pipeline construction (Appendix A).

3.0 METHODOLOGY

To evaluate the success of the process and construction used on this project, Navus contacted the key individuals indicated during the review of background information. Following a review of the information provided and conversations with the individuals, a questionnaire was developed. Prior to distribution and completion of the questionnaire, ASRD and AENV representatives were consulted. A site visit was completed and the questionnaire was used to gather information regarding the project perception, process and construction.

3.1 Questionnaire

The questionnaire (Appendix B) was developed to gain knowledge of the current understanding, construction practices and relationships with respect to the project. The questionnaire was separated into 5 main sections: included Philosophy, Project Specific, Working Together, Future Development and Miscellaneous.

3.2 Site Visit

A site visit, lead by Doug Kulba (AENV), was completed on February 4, 2009. Navus personnel were introduced to the key Devon representatives in charge of approvals, engineering and construction as well as the supporting contractor representatives. Photographs of the specific equipment attachments and machines in use as well as the finished product were taken and are presented in Appendix C.

Originally, it was thought that two site visits would be required to complete the project; however, it was apparent after the initial site visit that a second visit would not be required as the construction process would not be changing and the information gathered allowed for an adequate evaluation of the project.

3.3 Questionnaire Completion

On February 5, 2009, Navus personnel completed seven on-site interviews with the involved stakeholders on the project. Those interviewed on-site included the facility pipeline construction lead for Devon, two Devon construction supervisors, the pipeline contractor superintendent, the on-site environmental technologist (soil monitor) and two equipment operators. This group provided an accurate and comprehensive representation of those directly involved in the project construction.

The names and contact information of other key individuals involved in the pre-disturbance assessment, project planning, regulatory approvals and project engineering were collected and an electronic version of the questionnaire was sent out to these 11 key individuals for completion. One individual requested to complete the questionnaire over the phone and this was completed on February 13, 2009.

As stated above, the questionnaire was completed during on-site and phone interviews as well as through an electronic version communicated via email. The interviews between Navus personnel and each of the respondents were completed one-on-one in an attempt to best understand individual views and opinions regarding the project and initiatives.

4.0 RESULTS

Of the 11 electronic versions of the questionnaire that were sent out, three individuals declined to comment based on limited or no involvement, three did not complete the questionnaire and five respondents completed the questionnaire, completely or partially. The responses from the seven on-site interviews and five electronic versions of the questionnaire received (12 total) were compiled and reviewed.

The results of the questionnaire including similar comments and themes will be broken down and discussed by section, as the questionnaire was presented.

4.1 Philosophy

This section was developed to understand how each individual understands and interprets their role in the P.I.R.E. approach and the I.P.S. process. The individuals were asked to comment on their specific roles, the importance of the P.I.R.E. approach and the I.P.S. process as they see it and to describe the positive outcomes, any potential shortcomings and any required evolution of their current role to match the P.I.R.E. approach or the I.P.S. process.

4.1.1 Individual Roles

The individual roles of the respondents included:

- Initiating the P.I.R.E. approach
- Promoting the initiatives at the oil and gas producer level
- Engineering of the pipeline project
- Completing the approvals and permits required for the project
- Regulator
- Supervising project construction at the oil and gas producer (industry) level
- Monitoring soil removal and replacement activities
- Supervising project construction at the contractor level
- Operating equipment used during construction

All of the respondents understood the individual importance of their roles toward the success of the P.I.R.E. approach and the I.P.S. process. Their roles varied widely and included: providing broad based presentations and education on the initiatives to government and industry, encouraging contractors to promote I.P.S., ensuring the goals of the initiatives are incorporating the regulatory requirements and desired environmental outcomes and at an operational level, ensuring that all of the soil removed from the ditch is replaced appropriately. Those respondents who are in a position to bring together government, industry and contractors indicated the willingness to continue bringing these groups together on these types of projects.

Half of the respondents (6 out of 12) commented on the evolution of their specific roles to match the desired outcomes of the initiatives (P.I.R.E. approach and I.P.S. process). The comments stated that their current roles were continually evolving and adapting to meet the daily challenges faced to meet the desired project outcomes.

4.1.2 Importance of the P.I.R.E. Approach

The responses to this question have been summarized and they focus on the importance of improving working relationships between oil and gas producers, regulators and landowners, developing innovative solutions to resource development problems and in the end, all stakeholders sharing the responsibility for the outcome. The bulleted response from one individual, in effect, summarizes all of the responses and is as follows:

"To provide an opportunity for government and industry to share the responsibility and strive for economic and environmental excellence.

- Improved relationships provide an atmosphere of teamwork between the stakeholders setting higher standards within the industry by being less adversarial and more collaborative
- Improved reaction times establishes a venue to identify issues and come up with innovative solutions to problems in a proactive rather than reactive fashion
- Raises the bar
- Increases stakeholder value by reducing short and long term costs and liabilities, whilst improving our environmental outcome"

4.1.3 Importance of the I.P.S. Process

The responses to this question have been summarized and they focus on the importance of reducing the ecological footprint of pipelines, improving relations between stakeholders, increasing economic efficiency by reducing stumpage, timber salvage and any required spring clean-up efforts. One respondent stated, "It is a grassroots initiative in forested lands and will soon become the standard". Specific responses regarding the importance of the I.P.S. process included:

- "Benefits future generations – helps re-growth and colonization"
- "It is a better process – Higher costs up front, but the costs are saved on the back end"
- "Improved landowner and regulator relations by working with and not seemingly against them"
- "Increased environmental stewardship by reduced RoW usage"
- "Improved costs savings; Complete the work once and reduce the future risk of repairs; Reduced stumpage, salvage and clean-up efforts; Increased contractor efficiency and utilization of fewer resources"
- "Limits the footprint left behind"

4.1.4 Positive Outcomes of the Initiatives

The respondents discussed many positive outcomes of the initiatives. They included:

- Developing many strong relationships and partnerships between stakeholders (regulators, industry and landowners)
- Maintaining and continuing to build a positive working relationship between government and industry
- Providing positive recognition for industry to continue to build and maintain relations with local communities
- Phasing out the common practice of leaving large uneven, poorly compacted roaches behind after construction
- Taking care of the environment while improving the economics of pipelining by reducing the need for spring clean-up efforts
- Improving the aesthetics of pipeline construction when compared to traditional methods

4.1.5 Shortcomings of the Initiatives

Shortcomings were defined as potential areas of improvement or areas requiring additional attention in future projects. When developing a questionnaire, it is important to provide the respondents with an opportunity to comment on all aspects, whether they are positive or negative, regarding an issue or initiative. In this questionnaire, Navus provided the

respondents a section to describe any shortcomings they felt were present. It should be noted that of the 12 respondents to this questionnaire, 7 either did not respond or said there were no shortcomings deriving from the initiatives.

Comments provided in the "identified shortcomings of the initiatives" question included:

- From the point of view of government – "It's hard to get to everyone as quickly as you'd like. There are limited human resources to promote, distribute and build capacity to share the ideas and learnings from these initiatives"
- From the point of view of industry – "When promoting change, there is no shortage of "nay-sayers". Since there really hasn't been any substantial change on how government and industry have been doing things over the last 30+ years, breaking these instilled paradigms requires a lot of patience and perseverance"
- From the point of view of industry, specifically construction – "Up to this point, there have been no shortcomings. Everything has been positive"
- From the point of view of an equipment operator – "It takes longer now, but we don't have to come back later"

There were comments regarding the extended timeline of the approval process regarding the Pre-Disturbance Assessment and general project requirements regarding topsoil stripping, and mulch from the RoW being "moving targets". The extended timelines resulted in excessive frost setting into the ground and required more effort during construction. It is unclear if this extended approval process timeline is a function of these initiatives or is an expected component of the AENV/ASRD approval process. Work between the stakeholders should be completed to determine the causes of the delays and to determine the general project requirements to ensure the continued success of future projects.

4.1.6 Common Themes

Three common themes were observed in this section of the questionnaire. They included:

- The importance of maintaining and improving working relationships between government and industry

- The overall need of the pipeline industry to make an effort to reduce the ecological footprint
- The belief that everything being done to reduce the ecological footprint of this project is a step in the right direction and that the methods, techniques and equipment will continue to evolve and further increase efficiencies

4.2 Project Specific

This section was developed to understand how each individual was involved with and perceives the planning and construction phases of the project.

4.2.1 Project Planning

The individuals were asked to comment on their involvement in the project planning, which stakeholders were involved, which stakeholders should be involved and how, and identify areas where efficiencies may have been realized during the planning process.

4.2.1.1 Individual roles

The individual roles of the respondents with respect to project planning included:

- Overseeing the approval process from an industry perspective
- Obtaining approval for the Pre-Disturbance Assessment
- Review of the site specific project development, construction and reclamation plans from a government perspective
- Promoting the I.P.S. process
- Helping to determine project outcomes with respect to the initiatives
- Ensuring that all permits for construction are in place
- Planning at the pre-job and project meetings

4.2.1.2 Stakeholders

The identified stakeholders involved in the planning process included:

- AENV
- Devon Canada Corporation

- ASRD
- AMEC Earth and Environmental
- Risley Equipment Inc.
- Precision Engineering

The respondents stated that the appropriate stakeholders were involved in the process; however, most stated that the capacity and extent of each stakeholder's involvement should be modified in some way. The following quotations represent the wide range of responses to the questions of which stakeholders should be involved in the planning process and how they should be involved:

- "The stakeholders that have a responsibility in the end results should be involved in the planning process. They should provide clear direction of what the end results should be and provide expertise/knowledge if available. Stakeholders who do not or cannot provide the aforementioned should not be part of the planning process"
- "It would be helpful if the contractors/construction supervisors could be more involved in the front-end planning and regulatory submissions process. Many of the questions asked by regulators at the PDA/C&R stage of review are best answered in consultation with the people who will be in the field doing the work. Their involvement could increase the efficiency of the regulatory process"
- "The contractors need to be more involved up front"
- "There needs to be more of an integrated approach. It should be done completely differently. The stakeholders need to re-visit the entire approval process"
- "The government needs to be specific in identifying land resource outcome and industry has to be able to plan, implement, measure and monitor that they are meeting the outcomes"
- "ASRD needs to provide more project specifics regarding rollback and how to deal with stumps. They need to come out and see the project. Everything can't be done over the phone"
- "It would be helpful if ASRD was able to provide more expectations and let us know how they see the final product by providing mentorship and feedback on the project"

- "AENV and ASRD need to work together so we have one process to follow"

4.2.1.3 Efficiencies

This project is the pilot project using the I.P.S. process in forested lands in Alberta. For that reason, it is important to determine how to take the lessons and bring them forward to future projects. Having the respondents comment on examples of where efficiencies were realized or may have been realized throughout the project will help to increase efficiencies in the future. The following are comments on areas where efficiencies were realized on the project:

- "The contractor has 100% buy-in from the entire crew"
- "As methods and techniques involved with the I.P.S. were implemented in the field, they were evaluated and modified as opportunities for efficiency were proposed and realized"
- "From my position, I see that the client does not have to come back in the second season to do final reclamation. I see topsoil moved only twice and this has to be good. I see machinery working on top of the installed pipe; this will make a big difference in future PLA installation"

The comments regarding areas where efficiencies may be realized in the future with respect to planning revolved around the suggestion of having one governing body (i.e. AENV or ASRD, not both) direct the approval process and for that governing body to determine and communicate the requirements of the Pre-Disturbance Assessment prior to its completion. This clear communication will reduce the management time required of industry and government through the approval process.

4.2.1.4 Common themes

Three common themes were observed in the Philosophy section of the questionnaire. They included:

- The contractors and construction supervisors should be more involved in the front end project planning

- The appropriate stakeholders were involved in the planning of the project. Modifying their involvement and the timing of their involvement in the future will work to increase efficiencies
- Streamlining the approval requirements through the governing bodies (regulators) will help to increase efficiency in the future

4.2.2 Construction

The individuals were asked to comment on how the I.P.S. process differs from traditional methods, techniques or requirements and how these differences have impacted project timelines or financial targets compared to historical values and logistics. The individuals were again asked to comment on the evolution of their role and the areas of success with regards to the I.P.S. process. The individuals were then asked to comment on how 100% of the soil was being replaced and how this was being completed in the winter.

4.2.2.1 I.P.S. vs. conventional pipelining methods, techniques and requirements

The following table summarizes the differences between the I.P.S. process and traditional pipelining methods as noted by the respondents.

Conventional	I.P.S.
Planning	
- One method for all pipeline installations	- Plans are project specific with predetermined project goals
Equipment	
- Standard excavator and buckets (36 – 42")	- Packing wheels; Mulchers
Topsoil Salvage	
- Standard topsoil salvage is based on the type of equipment used to salvage topsoil	- Salvage is based on the size of pipe being installed. Minimal topsoil salvage required.
Ditching	
- Standard 1.0 – 1.2 m ditch	- Ditch width is tailored to the size of pipe being installed
Soil Replacement	
- 65 – 75% of spoil returned; ditch is compacted from the top down	- 100% of spoil returned; ditch is compacted from the bottom (safe zone) up reducing or eliminating the potential for slumping, sluffing or erosion
Future Clean-up	
- Extensive clean-up efforts often required if	- Minimal clean-up efforts required; minimal

the site is even accessible; high probability of ditch line settlement	probability of ditch line settlement
Project Costs	
- Traditional construction and spring clean-up cost structure	- Project is finished after construction; minimal to no clean-up effort required; back end clean-up costs are eliminated
Benefits	
- Traditional construction methods are widely practiced and understood	- Construction practices and specialized equipment are continually evolving and improving - Reduced overall ecological footprint - Increased compaction may lead to less pipe movement during freeze-thaw cycles reducing the risk of line failures - Reduced reclamation costs - Improved landowner satisfaction/relations - Use of mulching allows for more accurate topsoil salvage and no admixing under frozen conditions

The ditching requirements for this project were not unique but the construction techniques used to maximize usable space on the RoW were. The project required two ditchlines, each wide enough to accommodate the installation of three pipelines. The full RoW (50 m) was available for use; however, it was agreed by Devon to use a reduced RoW width wherever possible during construction. Working with the reduced RoW width created challenges during construction. By completing one, three pipeline ditch and returning 100% of the excavated soil, this allowed a trafficable area to be used during the construction of the other three pipeline ditch. This optimized the use of the RoW. Traditionally, the excavated soil would not have been 100% returned to the ditch and a large roach would have been left in place, leaving the area un-trafficable and a high potential for erosion.

Traditionally, pipeline clean-up contouring the large roaches left behind is completed in the summer/fall following the winter pipeline installation. These clean-ups are completed at a significant expense to the pipeline owner. However, these clean-up activities can only occur in areas with year round access. In the un-accessible areas the large roaches are not contoured leading to increased potential for erosion.

Using I.P.S. process the clean-up is not required as 100% of the soil is returned to the ditch during construction saving additional clean-up costs. This also effectively eliminates any potential for erosion increasing the ecological outcome of the project.

4.2.2.2 Impact of I.P.S. on project timelines

The general comments regarding the impact of the I.P.S. process on project timelines indicated that construction time is marginally longer during summer construction and only slightly longer during the winter. The approval and planning process were minimally impacted once all the stakeholders were knowledgeable with the process. The clean-up time will be less because less soil is disturbed. During summer and winter construction, clean-up is done immediately eliminating the traditional spring and summer pipeline clean-up work.

On this project specifically, due to lag time on the regulatory approvals, heavy frost set into the ground requiring extra effort mulching the soil to return it to the ditch. The lag time is an anomaly for this project and typical winter project management would occur under normal regulatory approval timelines.

4.2.2.3 Impact of I.P.S. on project finances compared to traditional costs

The general comments regarding the impact of the I.P.S. process on project finances indicated that any additional up-front costs associated with the system are negated by the fact that minimal to zero spring/summer clean-up efforts are required following project completion. One respondent also commented on "the hidden savings of the reduction or elimination of erosion issues and overall increased landowner satisfaction".

4.2.2.4 Impact of I.P.S. on project logistics

The general comments regarding the impact of the I.P.S. process on project logistics indicated that manpower and equipment needs are similar to traditional methods. Specialized equipment and attachments are required during specific phases of construction. The specialized equipment may include mulchers (for construction during frozen conditions) and packers (either self propelled or tow-behind). The specialized attachments may include Felco

rolling wheel compactors or specialized digging buckets such as Cameron buckets ranging from 8 – 22" wide.

During traditional spring/summer clean-ups, the equipment (dozers, graders and excavators) is often re-mobilized to the location and then used to complete the contour of the unevenly settled and poorly compacted ditch. Upon completion, the equipment is again transported from the site. Often this clean-up cost is over and above the construction cost of the pipeline and is paid for "by the hour" and not "by the meter" depending on the requirements of construction contracts. Often, in areas where winter construction was competed, the areas are not accessible during the spring/summer months and clean-ups cannot be completed.

In conclusion, the respondents believed that if the efforts required to achieve a traditional spring/summer clean-up are factored in, the total project logistics of the I.P.S. process, start to finish, would be less intensive.

4.2.2.5 Soil replacement

As stated in Section 4.2.2.1, the success of 100% soil replacement maximized the use of space on the RoW by leaving a trafficable footprint after the completion of the first pipeline ditch. Traditionally, a large roach would have been left in place over each ditch, requiring a larger right-of-way to provide adequate room for construction.

The general comments regarding soil replacement focused on minimizing the volume of soil salvaged through reduced ditch widths while replacing and compacting the soil in lifts using excavators equipped with packing wheels. To aid in the salvage of topsoil during frozen conditions, mulchers were used to reduce the potential for soil admixing.

In peatland areas (muskeg) the I.P.S. process was able to reduce the RoW width; however, the ditching process did not differ from conventional methods due to the physical characteristics of peat and the saturated underlying mineral material. Furthermore, one respondent stated that in areas with a high percentage of sand, it may be possible to compact

the soil too much and cause a "fill-deficit"; extra care and attention should be used when handling and compacting sandy soils.

4.2.2.6 Common themes

Four common themes were observed in this section of the questionnaire. They included:

- The use of the I.P.S. process reduces the ecological footprint of pipelines
- The I.P.S. process has been successful in all areas except for wet, muskeg conditions
- By reducing or eliminating the need for spring/summer clean-up efforts, project finances and logistics are reduced
- The bottom (safe zone) up compaction practices ensure that up to 100% of the soil is returned to the ditch

4.3 Working Together

The P.I.R.E. approach was designed to bring together stakeholders (landowners, contractors, industry representatives, AENV and ASRD) to identify and develop innovative solutions to oil and gas development concerns focusing on the construction and installation of pipelines in Alberta. It is understood that the success of this program falls on the ability of the stakeholders to work together and communicate efficiently throughout the process.

This section of the questionnaire was separated into two sections: project planning and project execution.

4.3.1 Project Planning

In this section, the individuals were asked to comment on the planning requirements of the I.P.S. process. The questions asked what the planning requirements of the I.P.S. process were and how they differed from conventional requirements, if the planning requirements added value to the project, if we were planning for the right things to achieve the desired outcome and if the project planning lead to achieving the project requirements. The individuals were also asked how they would see the project planning evolve on future projects if they were planning the project.

4.3.1.1 Planning requirements

According to the respondents, the actual project planning requirements for the project remained similar to traditional requirements with the exception of some specialized attachments for equipment and a mulcher. Comments focused on the required knowledge of specialized equipment and techniques and educating those involved as to the desired project outcomes.

From the perspective of the oil and gas producer, the planning requirements included an early decision to use the I.P.S. process to create an accurate cost estimate and a detailed description of expected construction practices at the contractor bid stage. Further experience in the I.P.S. process will streamline this for future projects.

Comments regarding the current planning requirements adding value to the project included:

- "The current planning requirements do not touch on the actual construction process. The contractor was not involved in the planning process"
- "There were no requirements set, we set the precedence" (Regarding construction requirements)

Responses for the question, "Are we planning the right things to achieve the desired outcome?" included:

- "There is an undetermined outcome with the current process. There is a lack of correlation between the planning process and actual follow though"
- "We won't know until we have done it. Then we can look back and modify process"

There was a wide range of comments regarding how the respondents see the project planning evolving in future projects. Comments included:

- "ASRD needs to provide more on-the-ground feedback on the project"
- "I would eliminate the EFR – PDA process. You could have one level of government required and one document required as part of the planning process"
- "Construction blueprints should be developed"

- "An environmental performance report should be developed as a measure of project success"
- "There could be an Environmental Pipeline Construction and Verification Report that identifies the details of each of the major construction components"
- "There should be a RoW width determination process based on construction factors and environmental conditions"
- "There should be an environmental commitment statement that is a very detailed plan defining the environmental commitments for the project"
- "There could be an Environmental Compliance report required detailing construction summary documentation, all notifications, approvals and permits, and an environmental protection plan that would identify any environmental deficiencies"
- "They should develop contingency plans for specific topographic areas"
- "Before we look at planning the next project, we need to evaluate this project and what we have accomplished. After a review of the project and seeing the actual results on the ground, we will be able to better identify areas to save time and money on future projects"
- "Specific construction requirements regarding roll back were not set for this project. Project planning occurred on the fly. Next time, we can look back and have something to compare to"

4.3.2 Project Execution

In this section, the two questions focused on the communication of the required role of each individual and how those individuals are thinking differently to achieve the goals of the project.

Of all the respondents, three did not answer and the remaining believed that their role had been effectively communicated to them. One comment stated: "There was minimal effective communication from ASRD to the Lands field staff that this project was in the works".

Regarding thinking differently to achieve the goals of the project, comments included:

- "We are working closer with the contractor to explain the process"
- "There have been learnings. We could have included fish and wildlife objectives for line of sight parameters"
- "We have been more innovative and creative, thinking as a team. This project has been bringing out the creativity and pride in people"
- "The thought of reducing the ecological footprint is a new way of thinking"
- "People have been thinking outside the box"

4.4 Future Development

The success of this initiative is based on proactive solutions and stakeholders working together. The P.I.R.E. approach has helped strengthen Alberta Environment's commitment to public assurance, resulting in improved construction practices, reduced industry liability and construction costs and increased stakeholder satisfaction.

Future development and continued growth are goals of the P.I.R.E. approach. Individuals were asked how can we determine the success of the I.P.S. process, how the initiatives (P.I.R.E. approach and I.P.S. process) should evolve in the short term (end of 2009), near term (2010) and long term (2011+) and asked to identify any duplication of efforts or redundancies within the PDA, EFR and the application/approval process. The respondents were also asked to comment on what areas of resource development the ideas from the two initiatives could be expanded to include.

4.4.1 Success

Comments on how to determine the success of the I.P.S. process on this project included:

- "A 100 – 150 m section of this project is being completed using conventional pipeline methods. We will be able to come back in the summer and compare the results of the I.P.S. process to this section"
- "By comparing the traditional section to I.P.S."
- "Compare the end results to others in the area"
- "Once it (I.P.S.) becomes the industry standard"

- "Come back for a tour after one full growing season to evaluate success"

4.4.2 Evolution of the Initiatives

The comments received regarding this set of questions on the future evolution of the initiatives focused on increasing awareness through education, communication and collaboration with other oil and gas producers, the creation of a demonstration area, the improvement of methods, equipment and techniques, ongoing monitoring and involving committed stakeholders to help share in the success story, and developing a good working relationship and trust with all parties involved.

4.4.3 Duplication of Efforts/Redundancies

There were few comments received regarding this set of questions. These comments included:

- "The PDA and EFR appear to be a duplication of the planning and approval process. Why do we need to have two different departments involved on crown land?"
- "With respect to approvals, the project ended up being delayed while we waited for answers from AENV after we had already received approval from ASRD"
- "There is a lot of duplication and yet there is information that pertains to each document. They could be combined into one"
- "There is some duplication/redundancy with these two processes. The PDA/C&R provides more detailed environmental information than the EFR while the EFR requires a very specific information format. It would be helpful if one document could cover off both requirements. In addition, the EFR and PDA are both reviewed by AENV and SRD officers, thereby requiring duplication of effort"
- Regarding the PDA: "Those who write the PDA must understand it…..There was only one hole per 100 m. We need more soil data and we need to add lateral soil data as well"

4.4.4 Future Expansion of the Ideas from the Initiatives

The comments in this section focused on improving relations between stakeholders during resource extraction, the reduction of the ecological footprint of resource development and bringing together government and industry to work together on resource development. Specific comments included:

- "There should be provincial replication of these programs"
- "The program should include agricultural land in Alberta as well"
- "If we can reduce the ecological footprint of pipelines, we should be able to do it in other places too"
- "The ERCB needs to be brought into the P.I.R.E. approach as they are the office that has the legislation for the PLA installation restrictions that will limit the success of this program. This needs and fits well with their desired land use framework"
- "All forms of resource development could benefit from the philosophy of improving and reducing the ecological footprint"

4.5 Miscellaneous Section

In this section Navus was looking for any feedback and recognition for the stakeholders involved in this project. The respondents were asked to comment on their experience with AENV and ASRD on this project and to pass on any recognition they have received from their employer, client, AENV or ASRD on this project.

4.5.1 Experience with AENV

Overall, the respondents indicated a very positive experience with Alberta Environment, specifically with Doug Kulba, on this project. Some of the comments included:

- "It was nice to have AENV out here for a pat on the back"
- "The staff were helpful and truly concerned with the project. The problem is that they were confined by a process (PDA) that is an approval requirement. We can achieve the same outcome without the level of academic rigor that is accorded the PDA. It is more of an academic process in many respects"
- "100 % Excellent"

- "AENV provided good discussion and ideas"

4.5.2 Experience with ASRD

The comments regarding the respondents experience with ASRD were as follows:

- "We went in and told them what we were going to do. They have not been a drawback. They have provided temporary field authorization's (TFA's) as required. They asked about the process and had a good understanding"
- "It was good, but I would have liked to have seen more assistance on the desired outcomes they expected and wanted to see on the land regarding mulching, vegetation etc…"
- "They expressed interest in the process at the planning stage but really did not participate or collaborate in the success of this project"
- "I haven't seen them out here yet"

4.5.3 Recognition Received

The respondents noted recognition from their employers, clients and from AENV on this project in the form of formal recognition through meetings and letters, hats, stickers and an everyday "pat on the back".

4.6 Site Visit

The site visit completed by Navus personnel revealed clearly how the I.P.S. construction method reduced the overall ecological footprint compared to conventional construction method through reduced width of right-of-way, elimination of roach, increased soil stabilization within the trench and minimized topsoil salvage. The volume of topsoil salvaged was minimized by reducing the RoW width and leaving the topsoil in place on all areas other than the trench and on areas where subsoil piles were temporarily windrowed. Snow was packed on top of areas where topsoil was left in place, reducing the impacts from frequent construction traffic. Prior to soil salvage, a mulcher had broken up the frozen layer resulting in the breakdown of the frozen soil and intact roots into fine material.

Visual inspection of topsoil piles revealed some soil pulverization had occurred, the majority of roots were damaged or destroyed and in some areas, a high amount of fine woody debris was incorporated into the soil. However, there were areas along the pipeline where soil structure was better maintained and coarse woody debris was more prevalent than smaller pieces of woody debris.

During the interviews, the positive outlook and pride for the project and initiatives were apparent from all stakeholders. The new challenges faced by implementing the I.P.S. process and the understanding of how the system reduced the overall ecological foot print seemed to create enthusiasm toward the project from each individual that was interviewed.

5.0 CONCLUSIONS

The completion of this report involved Navus communicating with the various stakeholders, developing a questionnaire to highlight the P.I.R.E. approach and the I.P.S. process with respect to the current project, completing a site visit, completing on-site interviews using a questionnaire and providing electronic versions of the questionnaire to key individuals involved in the project. From there, the responses to the questionnaires were reviewed, compiled, common themes identified and results summarized. Additionally, the approval, PDA and EFR, where applicable, were compared with the received questionnaire responses.

For the purposes of this report, it should be noted that the views of oil and gas producers are being represented by one oil and gas producer; however, the views of multiple departments within the company such as the project engineers, project leads, environment and construction leads were obtained through the questionnaire process.

The P.I.R.E. approach was created by Mr. Kulba and through relationships with stakeholders (contractors, regulators and industry) the approach has been discussed and put into action. The I.P.S. process was implemented as a result of the P.I.R.E. approach with the goal of reducing the ecological footprint during the construction of pipelines in Alberta.

Conclusions regarding each of these initiatives will be discussed in the following two sections.

5.1 P.I.R.E.

The conclusions regarding the P.I.R.E. approach are presented below.

- The P.I.R.E. approach is based on a foundation of communication and collaboration to outline and achieve desired outcomes and specific project goals
- The P.I.R.E. approach made the goal of reducing the overall ecological footprint clear to all stakeholders, resulting in the ideology of using new concepts and technology in practice
- It is important for regulators to provide positive and constructive feedback to industry because it gives the assurance to industry that the desired project goals are being achieved and allows industry to modify construction practices during the project, based on the received feedback. This feedback loop provides a foundation of knowledge to bring forward to future projects
- Important relationships between stakeholders have been formed as a result of the P.I.R.E. approach on this project
- Industry has taken a proactive role in advancing new technologies to improve environmental stewardship
- While conducting the site visit, the positive outlook and pride for the project and initiatives was apparent with all stakeholders
- The expectations in regards to some construction practices (i.e. topsoil salvage depths, the use of mulching and the rollback of coarse woody debris) were unclear between stakeholders
- Overlapping efforts between AENV and ASRD exist in the approval process and between the EFR and PDA. As a result, this overlap may have affected certain components of the project timeline

5.2 I.P.S.

The conclusions regarding the I.P.S. process are presented below.

- The I.P.S. process was created to reduce the ecological footprint of pipeline construction in Alberta by reducing RoW width and modifying construction practices
- The I.P.S. effectively reduced the ecological footprint of the project by reducing the width of the RoW used for construction and 100% soil replacement into the ditches
- The site visit immediately highlighted the success of the I.P.S. concept with respect to 100 % soil replacement, the lack of a roach following winter pipeline construction and the decreased right-of-way width cleared/used during construction
- The I.P.S. met the project goals and upon evaluation of success, it is anticipated the project will set the standard for winter pipeline construction in Alberta
- In the view of construction companies, there will be a slight increase in construction effort while the work traditionally required as part of the spring/summer cleanup will be drastically reduced
- Although actual financial data were not available for review, through communications on the project, those involved perceived a slight increase in up-front costs and anticipated a large reduction in back-end costs compared to historic clean-up efforts. Those in the position to comment and project the financial benefit of the I.P.S. process believe it is, and will continue to be, a success. As knowledge, methods and equipment availability increase, efficiency will increase and be passed along to future projects
- Mulching topsoil prior to soil salvage pulverized the soil and as a result, plant roots were damaged. The overall impact to soil quality from this pulverization and the incorporation of mulch with topsoil is unknown

The project was planned and completed with the intent of reducing the environmental footprint and improving the ecological outcome. Upon evaluating the success of the project through upcoming site inspections (summer/fall 2009), this evolution in pipeline project planning and execution will set the standard for years to come.

6.0 RECOMMENDATIONS

Based on the evaluation of the P.I.R.E. approach and I.P.S. process with respect to the current project and incorporating suggestions from key stakeholders, Navus has compiled a list of general, P.I.R.E. specific and I.P.S. specific recommendations.

6.1 General Recommendations

A general recommendation would be to assess the potential of developing best management practices for pipeline construction activities in the forested regions. The best management practices could include information and requirements regarding construction methods and equipment, topsoil salvage depths and techniques, coarse woody debris management, the mulching of topsoil and woody debris and the effects of timing on construction activities during frozen conditions.

The future development of the P.I.R.E. approach and I.P.S. process is based on increasing the awareness of their success. A travelling presentation could be assembled to showcase their success stories to industry and contractors through various interest groups such as the Canadian Land Reclamation Association, Alberta Institute of Agrologists, Association of Professional Engineers, Geologists, and Geophysicists of Alberta, the Association of Science and Engineering Technology Professionals in Alberta. This presentation could also be used to engage local community groups and landowners when completing large projects or large volumes of projects in a specific area of the province.

A knowledge base could be developed to document the success of the P.I.R.E. approach and I.P.S. process. This could be web-based and would provide the goals and objectives of the P.I.R.E. approach, examples of success stories from stakeholders, a medium for discussion on the issues, examples of the equipment and technologies used and would provide contact information for individuals to learn more about the P.I.R.E. approach.

6.2 P.I.R.E. Recommendations

The recommendations for consideration as the P.I.R.E. approach moves forward are presented below.

- Promote the inclusion of additional stakeholders such as the ERCB, Alberta Fish and Wildlife and the Department of Fisheries and Oceans, to ensure all stakeholders best interests are presented in pursuit of the goal to reduce the ecological footprint of pipeline construction in Alberta
- AENV and ASRD should continue and increase their presence promoting a reduction of the ecological footprint of pipelines in the forested regions
- Many comments were received regarding the approval process on this project. AENV and ASRD should work with the stakeholders on this project and on future projects to streamline requirements and expectations at all levels (approvals through construction). These conversations may help to streamline the requirements of the EFR and PDA process. Section 2.1.3 provides a comparison of the information overlap and gaps between the PDA and EFR documents. Streamlining these two documents into one would be possible; however, it would require modifications to current approvals and the current approval process.

6.3 I.P.S. Recommendations

The recommendations for consideration as the I.P.S. process moves forward are presented below.

- Future monitoring comparing the outcome of the two pipeline methods (Conventional vs. I.P.S.) should be conducted. As a part of this monitoring, the stakeholders should return to the construction site in the fall of 2009 to complete a site visit, take photos and document the success of this project
- If the results from the 2009 monitoring of this project are favorable, the I.P.S. process should be made mandatory in most settings
- A group could be established to monitor the outcome of the I.P.S. process and new technologies. Upon the determination of success, regulators may consider promoting the use of the new technologies through incentives

7.0 REFERENCES

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8.0 LIMITATIONS

This report has been prepared for the sole benefit of Alberta Sustainable Resource Development (ASRD). This document may not be used by any other person or entity, with the exception of Alberta Environment without the express written consent of Navus Environmental Inc. (Navus). Any use of this report by a third party, or any reliance on decisions made based on it, or damages suffered as a result of the use of this report are the sole responsibility of the user.

The information and conclusions contained in this report are based on work undertaken by trained professional and technical staff in accordance with generally accepted scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgement of Navus based on the data obtained during the project. Conclusions and recommendations presented in this report should not be considered legal advice.

Partners in Resource Excellence - Overview

What is Partners in Resource Excellence? Partners sharing the responsibility/striving for excellence

Partners in Resource Excellence (P.I.R.E.) are an outcome-based environmental management approach that recognizes that stakeholders must share the responsibility of resource development and strive for economic and environmental excellence. It brings together landowners, contractors, industry representatives and Alberta Environment staff to identify and develop innovative solutions to oil and gas development concerns, particularly the construction and installation of pipelines in Alberta. Partners in Resource Excellence is instrumental in helping Alberta Environment build trust among stakeholders and has resulted in increased stewardship and the development of a Low Impact Pipeline Construction system.

Why did Partners in Resource Excellence begin?

Construction and installation of approximately **15,000** kms per year of pipelines across Alberta results in a significant land disturbance in addition to already **400,000** kms of pipelines already installed. Alberta Environment's Grande Prairie staff realized a number of similar on-going concerns arose during the conventional construction and installation of pipelines. The issues identified include the amount of topsoil salvaged, the size of the ditch in relation to pipeline diameter and the volume of soil displaced, incomplete return of soil into the ditch, weed issues and the time before the land is returned to the landowner and the resulting reclamation costs and ongoing environmental liability.

Alberta Environment's Grande Prairie staff began Partners in Resource Excellence as a means of communicating the desired land outcomes to the stakeholders and at the same time created an incentive to develop new procedures, tools and technology to meet agreed upon environmental outcomes of pipeline projects. Staff acknowledged they needed help and sought out key innovators to develop and prototype new technologies to modify current pipeline practices. Alberta Environment and its' partners continue the work of improving the systems approach to pipeline construction.

How has Partners in Resource Excellence made Alberta Environment's business different today?

Partners in Resource Excellence models the realization that Alberta Environment's role is more than just regulating it's about partnerships and innovative resource development solutions. Stakeholders are acknowledging that this approach is proactive, outcome-based and results in an increase on their return on investment. They are now coming to Alberta Environment to help them think differently about the effectiveness of their practices and to help them find solutions to meet the desired economic, environmental and social outcomes. These are mutual goals. It's an understanding that some of our current practices must adapt to the anticipated challenges and expectations of stakeholders.

This approach is helping move our department toward a proactive ethic of stewardship, conservation and continual strive for economic and environmental excellence. Working together with contractors, consultants, inventors, landowners and the oil and gas industry has led to the development and use of specialized tools and technology that has resulted in reducing the overall impact and footprint of pipeline construction in Alberta.

What are the results of Partners in Resources?

Partners in Resource Excellence has helped strengthen Alberta Environment's commitment to public assurance, resulted in improved construction practices (Low Impact Pipeline Systems), reduced industry liability and their construction costs and increased stakeholder satisfaction.

The Partners in Resource Excellence approach has grown from involving only one company – Paramount Resources – to involving several, including Devon Canada, Stratus Pipelines, Biome Land Use Consulting, Risley Manufacturing, Alberta Sustainable Resource Development , Low Impact Pipeline Systems Ltd. and others.

This network of participating companies continues to expand and continues to share the responsibility of resource development and strive for an outcome of economic and environmental excellence.

Source: Doug Kulba, Alberta Environment – Grande Prairie Office (January 2009)

Partners in Resource Excellence (P.I.R.E.) / Innovative Pipelining Systems (I.P.S.)

Information:

- Date:
- Name:
- Company/Organization:
- Based out of:
- Length of time with company/organization:
- Title:
- Length of time in this position:

Contact Information:

- Office:
- Cell:
- Fax:
- Email:

Section 1 - Philosophy

1. What is your role in the P.I.R.E. program and/or I.P.S. process?
2. What is the importance of the:
    a. P.I.R.E. Program
    b. I.P.S. Program
3. How does your role work to make this/these program(s) a success?
4. With respect to your current role, from your experience working with this program:
    a. Describe the positive outcomes of the program implementation
    b. Describe any shortcomings deriving from the program implementation
    c. Has your role evolved to match the program requirements, or has your role remained the same?

Section 2 – Project Specific

Planning

5. How is your current role involved in the project planning process?
6. Given your current role, which stakeholders were involved in the planning process?
7. In your opinion, which stakeholders should be involved in the planning process? How should they be involved?
8. During the planning process, describe any examples where efficiencies may have been realized

Construction

9. What is being done that differs from traditional methods, techniques or requirements?
10. How have these differences impacted the following:
    a. Project Timelines (From approval – planning – construction – clean-up)

b. Project Financials (More or less time/man hour/management requirements? More or less equipment costs/time?)
c. Project Logistics (more/less equipment, people, etc…)

11. Has your role changed since the implementation of the I.P.S. process on this project? If yes, how has it changed?
12. Identify the areas where the implementation of the I.P.S. process has been successful.
13. How are you replacing 100% of the disturbed soil?
14. How are you able to replace the topsoil today, during the winter?

Section 3 – Working Together

The P.I.R.E. program was designed to bring together stakeholders (landowners, contractors, industry representatives, Alberta Environment and Alberta Sustainable Resource Development) to identify and develop innovative solutions to oil and gas development concerns focusing on the construction and installation of pipelines in Alberta. It is understood that the success of this program falls upon the ability of the stakeholders to work together and communicate efficiently throughout the process.

Project Planning

15. What are the planning requirements of the low impact pipeline system? Do they differ from traditional requirements?
16. Do the current planning requirements add value to the project?
17. Are we planning for the right things to achieve the desired outcome?
18. How do you see the project planning occurring?
19. Was the project planning able to achieve all of the project requirements?

Project Execution

20. Has your role been effectively communicated in order to achieve the goal of the project?
21. How are you thinking differently to achieve the project goals?

Section 4 – Future Development

The success of this program is based upon proactive solutions and stakeholders working together. P.I.R.E. has helped strengthen Alberta Environment's commitment to public assurance, resulted in improved construction practices, reduced industry liability and construction costs and has increased stakeholder satisfaction.

22. How should we determine the success of the I.P.S.?
23. In your opinion, how should the P.I.R.E. relationship and/or I.P.S. program evolve to increase success in the:
    a. Short term (End of 2009)
    b. Near Term (2010)
    c. Long term (2011 +)

24. Are you able to identify any duplication of efforts or redundancies within the following:
    a. Pre-disturbance assessment (PDA)
    b. Environmental Field Report (EFR)
    c. Application/Approval process.

25. What areas of resource development in Alberta could this program or the ideas from the P.I.R.E. program and the I.P.S. process be expanded to include?

Misc:

26. How was your experience with AENV on this project?
27. How was your experience with ASRD on this project?
28. How has your input on this project resulted in recognition from:
    a. Your employer
    b. Your client
    c. AENV
    d. ASRD

General Comments/Recommendations?

Project Goals: I.P.S. – Decrease ecological footprint, Soil conservation (100% soil replacement)

Stakeholders: AENV, ASRD, Devon Canada

Photo 1. View of frozen topsoil mulching

Photo 2. View of mulched frozen topsoil being windrowed by grader

Evaluation of the P.I.R.E. Approach	Client: **Alberta Sustainable Resource Development**	
	Consultant: navus ENVIRONMENTAL **Navus Environmental Inc.**	
	Photo Date: February 4-5, 2009	Page 1 of 5

Photo 3. View of ditching using a specialized digging bucket

Photo 4. View of the equipment shading to prepare the "safe zone" for compaction

Photo 5. View of excavator compacting ditch line using Felco wheel

Photo 6. View of self propelled packer compacting the ditch line

Photo 7. View of large pieces of frozen soil separated to be mulched and compacted

Photo 8. View of compacted, completed pipeline awaiting rollback of strippings

Photo 9. View of salvaged topsoil that had been mulched prior to stripping

Photo 10. View of salvaged topsoil strippings